

Powering Agriculture: Uganda Action Plan

Achieving a vibrant food system with productive use of renewable energy



Executive Summary

In Uganda, where an estimated 70 percent of the workforce is agrarian, achieving middle-income status outlined in [Vision 2040](#) requires increasing agricultural output productivity. Seeing the unique opportunity for the decentralized renewable energy (DRE) sector to help Uganda achieve both these means, Power for All collaborated with the Ministry of Energy and Minerals Development to establish a technical working group (TWG) on the productive use of energy (PUE) in agriculture. This action plan is the result of the TWG and the inputs of over 30 organizations assembled for the National Visioning Meeting on Productive Use of DREs for Agriculture in March 2022. Together, key stakeholders in the agriculture and energy ecosystem (see page 3) identified 10 critical actions that will help accelerate adoption of PUE technologies in pursuit of Vision 2040, as well as Sustainable Development Goal (SDG) 7 and SDG 2. In addition to prioritizing access to finance tailored to profiles of borrowers such as smallholder farmers and small and mid-size enterprises (SMEs), this action plan emphasizes the importance of raising awareness about the opportunities that DRE and PUE provides to agriculture sector. Together, the collaborative prioritized actions in the Uganda agriculture and energy sectors that both will work on—and advocate for—in 2022-2023.

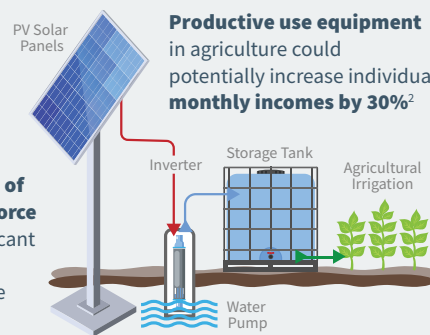
The Context

Agriculture accounts for 70 percent of employment, and provides half of all exports and one-quarter of GDP in Uganda.¹ The third National Development Plan (targeting 2020 to 2025) highlights the sector's expected contribution to future economic growth and economic inclusion.² According to the World Bank, the average Total Factor Productivity (TFP) growth—the difference between aggregate output growth and the growth of all inputs and factors of production that produced it—in Uganda has been negative for the last two decades. Uganda's national agricultural output has grown at only 2 percent per annum over the last five years, compared to agricultural output growth of 3 to 5 percent in other East African Community (EAC) members and 3.3% per annum growth in Uganda's population over the same period.³

Agricultural sector in Uganda employs the majority and provides the highest potential for impact



Agricultural sector employs over **70% of Uganda's work force** and has the significant potential for value addition across the country¹



Sources: OCA analysis & interviews supplemented by

1. CIA World Fact Book: <https://www.cia.gov/library/publications/the-world-factbook/fields/2048.html>

2. National Survey and Segmentation of Smallholder Households in Uganda

The Challenge

Improving agricultural productivity requires mechanization, which in turn necessitates reliable, affordable access to energy. Mechanization and new technologies in agriculture remain low in the country; about 90 percent of farmers in Uganda still rely on manual labor alone.⁴ As millions of Ugandan farmers do not have reliable energy, there is little incentive to invest in power-dependent productive applications such as water pumping and irrigation or cold chain facilities—exactly what is needed for increased productivity. Today, mass adoption of PUE is hindered by the lack of consumer knowledge, as well as adequate financial and policy support. Just as farmers are unfamiliar with PUE appliances, many commercial lenders are unfamiliar with DRE and PUE appliances and how to finance them.⁵ A solar-powered pump and sprinklers, for example, cost \$725 on average⁶ yet over 77 percent of Ugandan farmers earn \$61 per month, and are unable to afford the benefits that agricultural PUE can deliver.⁷ At the same time, many smallholder farmers are not able to demonstrate the level of creditworthiness necessary to secure a bank loan to purchase PUE equipment. Altogether, the lack of policy coherence and inadequate coordination among sector actors—as well as energy and agriculture-related ministries and agencies—have been major hurdles in developing policies needed to support adoption and scaling, including funding and processes for financing smallholder farmers's adoption of PUE.

The Opportunity

Whether for an irrigation system, milling machine, refrigerator or ice-maker, PUE applications can improve lives and livelihoods across peri-urban and rural agricultural communities (areas often without grid connections) while contributing to GDP. For instance, solar-powered irrigation enables production of diversified, high-value crops like fruits and vegetables all year round, free from seasonal limitations. According to a recent GIZ Endeavor survey, smallholder farmers might enhance their production by 40 to 50 percent by employing solar-powered irrigation.⁸ Horticultural exports could increase by \$14 million as a result of this. Solar pumps are also predicted to be 22-56 percent cheaper than diesel pumps over their lifetime, with a payback time of only two years, according to the survey.

Uganda signed the Malabo Declaration on Agriculture in 2003, committing to make investments in suitable, reliable, and affordable mechanization and energy supplies needed to double productivity by 2025.⁹ Decentralized renewable energy options such as standalone solar systems and mini-grids provide a fast, affordable solution to national energy poverty, which limits both personal and professional opportunities for Ugandans. Unlike diesel-powered generators or other agriculture machinery, DRE coupled with PUE equipment allows for the sustainable mechanization of commercial activities to prevent environmental damage. Together, DRE and PUE can scale production, extend shelf life of produce and earn more while also increasing energy consumption in the agri-food sector. This boosts the viability and commercial feasibility of the decentralized renewable energy industry, at the same time enabling agricultural productivity with the mechanization of farming and commercialization processes including cold storage and efficient transportation.

The Actors

Uganda's renewable energy and agriculture sectors can work with the Ugandan government to improve the country's agricultural commercialization strategy and contribute to its agro-industrialization objective.¹⁰ The ministries of Agriculture, Animal Industry, and Fisheries and Energy and Minerals Development have an opportunity to collaborate on providing an enabling policy environment for effective use of renewable energy across the country. To encourage growth of both the DRE and PUE sectors needed to help achieve Vision 2040, the Ministry of Finance, Planning, and Economic Development can accelerate PUE adoption

through subsidy and tax policies, as well as access to finance and micro loans for farmers. The Government of Uganda could accelerate overall electrification by engaging with the private sector in the non-grid energy business and development partners through the Energy Sector Working Group (ESWG).

10 Critical Actions

1. Create a national policy framework that harmonizes the priorities of the ministries of Energy and Mineral Development and Agriculture Animal Industry and Fisheries, to include DRE and PUE access as a lever for agricultural productivity.
2. Develop a national strategy for scaling renewable energy for productive use in the agriculture sector, including integration with the [Draft National Energy Policy](#), the [Renewable Energy Policy](#) and [National Agricultural Policy](#).
3. Enable collaboration between the Government of Uganda, the private sector and development agencies to coordinate promotion of PUE in agriculture, including improving ease of doing business for DRE and PUE companies
4. Prioritize ease of access to finance that enables smallholder farmers to adopt renewable energy technologies, including state-sponsored credit facilities, local banks, and microfinance institutions
5. Increase the amount of early-stage funding and patient capital for innovative PUE solutions with strong potential and relevance for Uganda which may not be at market ready status
6. Create credit reference profiles for Ugandan solar energy companies to help commercial lending institutions easily work with them by providing credit worthiness information about these business
7. Waive Value Added Tax (VAT) and import duty for DRE and PUE appliance components (e.g. batteries) to support job creation and small businesses in rural, poor areas.¹¹
8. Fund research and testing of off-grid productive use appliances through bodies like Uganda National Bureau of Standards (UNBS) to define or adopt metrics for quality in the industry
9. Create partnerships between commercial lenders and agricultural value chain intermediaries such as producer cooperatives and agro-input dealers to extend energy loans to farmers for appliances such as solar water pumps, dryers, etc
10. Create skilling and job opportunities in PUE through collaborations between the private sector, vocational training(TVET) centers and the Ministry of Education that adds DRE to curricula, leading to more technicians to service PUE equipment.

About

This action plan is the result of the solutions presented at the National Visioning Meeting on Productive Use of DREs for Agriculture, held in March 2022. Power for All and the Ministry of Energy and Mineral Development (MEMD) convened a meeting of key stakeholders in Uganda's energy and agriculture sectors to create a cohesive, stakeholder-driven action plan to accelerate adoption of decentralized renewable energy for agricultural productive use in Uganda. The meeting sought to clarify critical actions for market transformation and identify key organizations to affect change.

The stakeholders included: Access to Energy Institute (A2EI), Advocacy Coalition for Sustainable Agriculture (ACSA), Alliance for a Green Revolution in Africa (AGRA), Aptech Africa - Uganda, East Africa Power, EnerGrow, European Union (EU), Farmers Media, Food and Agriculture Organization, GIZ, GOGLA, Heifer International, International Food Policy Research Institute (IFPRI), Makerere University, Ministry of Agriculture Animal Industry and Fisheries (MAAIF), Ministry of Energy and Minerals Development, Ministry of Water and Environment, New Vision, Open Capital Advisors, Rockefeller Foundation/Global Energy Alliance for People and Planet (GEAPP), Solar Now, Strategic Response on Environment Conservation (STREC), Uganda National Farmers Federation, Uganda National Renewable Energy and Energy Efficiency Association (UNREEEA), Uganda Solar Energy Association, United Nations Capital Development Fund (UNCDF), USAID Power Africa Off Grid Program, Village Energy, Winch Energy, Young Farmers Champions Network, supported by Power for All.

Power for All

Power for All is a multi-stakeholder coalition working to rapidly scale decentralized renewable energy in order to achieve universal electricity access before 2030. Decentralized renewables—including green mini-grids and solar systems designed for households, businesses and productive use appliances—offer the fastest, most affordable and cleanest path to electricity access for all. Power for All brings together over 300 business, finance, research, and civil society organizations. Learn more at powerforall.org.

Notes

1. Statistical Abstract 2020, Uganda Bureau Of Statistics (2020): 31, https://www.ubos.org/wp-content/uploads/publications/11_2020STATISTICAL_ABSTRACT_2020.pdf
2. National Development Plan III, National Planning Authority, Government of Uganda (July 2020): 28, http://www.npa.go.ug/wp-content/uploads/2020/08/NDPIII-Finale_Compresed.pdf
3. Closing the potential-performance divide in Ugandan agriculture (English), World Bank Group (2018): 71, <http://documents.worldbank.org/curated/en/996921529090717586/Closing-the-potential-performance-divide-in-Ugandan-agriculture>
4. Wanyama, J. et al (2016). Profiling agricultural engineering technologies for mechanizing smallholder agriculture in Uganda Agricultural Engineering International: CIGR Journal, 18(4):41
5. Promoting Productive Uses of Energy in Uganda. Open Capital Advisors (2017): 25-27.
6. USAID- Power Africa <https://powerafrica.medium.com/productive-use-of-electricity-for-development-expanding-access-in-uganda-3373ddd94d>
7. Living Wage Report, Rural Uganda 2019. Global Living Wage (September 2020): 49. https://www.globallivingwage.org/wp-content/uploads/2020/10/LW-Report_Rural-Uganda_2019.pdf
8. Sustainable Energy for Smallholder Farmers in Ethiopia, Kenya and Uganda Baseline Study and Market Assessment: Endeavor (2021):79.
9. CAADP Country Implementation under the Malabo Declaration, New Partnership for Africa's Development (2016):17, https://au.int/sites/default/files/documents/31251-doc-the_country_caadp_implementation_guide_-_version_d_05_apr.pdf
10. Agriculture Sector Strategic Plan 2015-2020, Ministry of Agriculture Animal Industry and Fisheries, Government of Uganda. <https://www.agriculture.go.ug/agriculture-sector-strategic-plan-assy/>
11. Solar generation components like solar panels that are tax exempt in Uganda.

Powering Agriculture: Action Plan Matrix

Over 40 stakeholders across agriculture and energy ecosystems in Uganda identified key issues preventing broader adoption of DRE and PUE solutions in the agriculture sector and recommended potential solutions to these barriers. The matrix below summarizes the initial overview of critical next steps to advance productive use of renewable energy in Uganda.

KEY ISSUES	PROPOSED SOLUTIONS	RESPONSIBILITY	MEASURE OF SUCCESS
Awareness: Limited knowledge of the benefits of renewable PUE for agriculture	<ul style="list-style-type: none"> Increase the level of awareness among farmers through farming cooperatives Translate DRE and PUE knowledge products into local languages Capacity-building workshops for farmers and policy makers to improve knowledge levels 	Development partners (FAO, GIZ/EnDev, EU) Government CSOs and farming co-ops	Increased number of farmers with awareness about Productive Use of Renewable Energy. Increase in knowledge of DRE solutions amongst policy makers
	<ul style="list-style-type: none"> Identify PUE “champions” in government to help drive awareness and support for PUE with peers across departments 	Ministries of Agriculture, Water and Energy	Increase in level of knowledge and support of PUE amongst ministry officials
	<ul style="list-style-type: none"> Set-up demonstration sites for hands-on training at the farmer cooperatives in addition to model farms 	Solar energy companies, Ministry of Agriculture	Increase in number of demonstration farms showcasing PUE technologies
Finance: Smallholder farmers unable to access financing for PUE	<ul style="list-style-type: none"> Commission a study of agricultural borrowers to understand specific financial need 	Ministry of Finance, Commercial banks and MFIs	Increase in number of tailor-made financing packages for farmers
	<ul style="list-style-type: none"> Develop alternative credit ratings vis a vis DRE companies and repayment histories to enable financing for farmers 	Solar energy companies, Credit Reference Bureau	Universal credit profiles with credit reference bureau
Finance: High Up-front costs prevent farmers from purchasing PUE	<ul style="list-style-type: none"> Develop financing options for farmers to reduce up-front costs for agro processing 	Agriculture Sector Development Partners Group, Ministry of Agriculture	Increase in number of farmers paying for agro-processing services
	<ul style="list-style-type: none"> Establish VAT and duty exemptions for PUE appliances 	Ministry of Energy, Ministry of Finance	Reduction in purchase cost of DRE appliances in Uganda
Policy: Inadequate policies and funding to achieve PUE scale	<ul style="list-style-type: none"> Develop a national strategy on productive use of energy with an implementation plan 	Interministerial PUE task force on productive use of renewable energy	A national productive use of renewable energy for agriculture strategy developed and implemented.
	<ul style="list-style-type: none"> Evolve national policies to incorporate strategies to accelerate deployment and adoption of PUE in agriculture 	Inter-ministerial taskforce	Government policies that support scaling PUE for agriculture
Policy: Inadequate policies and funding to achieve PUE scale	<ul style="list-style-type: none"> Increase incentives such as tax waivers and subsidies for PUE technologies 	Ministry of Energy, Ministry of Finance	
Business models: Insufficient evidence on practical and scalable business models	<ul style="list-style-type: none"> Prepare inventory of the existing business models 	Power for All, NREP, Ministry of Energy, Access to Energy Institute	An inventory of successful business models that can be replicated
	<ul style="list-style-type: none"> Support private sector pilots that integrate DRE and PUE in areas without energy access 	Energy Sector Working Group	Number of business models successfully implemented